



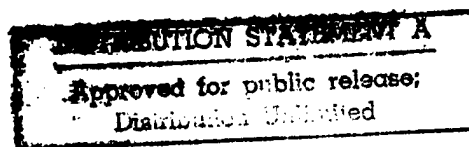
RELATIONSHIP OF AIRLINE PILOT DEMAND  
AND AIR FORCE PILOT RETENTION

GRADUATE RESEARCH PROJECT

John H. Kafer, Captain, USAF

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AIR UNIVERSITY  
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GRADUATE RESEARCH PROJECT

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Masters of Air Mobility

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Abstract

The airline industry has traditionally relied heavily on the pool of pilots leaving the military for its supply of jet aircraft pilots. Over the last several years, the military has drastically downsized its forces, including a substantial reduction in the number of pilots. At the same time, the airline industry continues to grow, increasing its demand for pilots, many of whom will have military experience. The purpose of this study is to provide a better understanding of the relationship between airline hiring and Air Force pilot retention. Using past airline hiring characteristics, military and civilian pilot trends, and forecast airline growth, the impact of airline requirements on Air Force retention is discussed. Additionally, the new military force structure includes increased reliance on the Air Reserve Component. A brief analysis of reduced pilot production and retention on the Air Force Reserve and Air National Guard is included.

Recommendations admit that, while a single, fix-it solution to pilot retention does not exist, there are many things personnel planners should consider. First and foremost is the need to understand that pilot retention is a result of supply and demand. Other considerations include the need for a long-term focus, replacing the pilot bonus with increased pilot flight pay, increasing pilot production, and continued emphasis on quality of life initiatives.

# RELATIONSHIP OF AIRLINE PILOT DEMAND AND AIR FORCE PILOT RETENTION

## I. Overview

### Introduction

Over the past several decades, the economic conditions in the airline industry have cycled dramatically from rapid hiring after Vietnam, through downturns in the early 80s, to rapid hiring again in the late 80s, layoffs in the early 90s, to the current era of rapid hiring. Through each of these periods, pilot retention rates in the Air Force have fluctuated, leaving personnel planners with the challenge of maintaining a properly manned pilot force. Force restructuring during the mid 1990s left the Air Force with too many pilots relative to requirements. The Air Force responded by encouraging voluntary departures, allowing early retirements, and reducing the number of new pilots trained while forecasting a pilot shortage only a few years later. Future demand for a smaller supply of Air Force-trained pilots by the growing airline industry is likely to present challenges to Air Force personnel planners well into the next century.

Airline hiring trends play a major role in Air Force pilot retention. Nearly every recent edition of *Air Force Times* contains a new article on the retention problem including a list of reasons why pilots are leaving the Air Force for better paying airline jobs. This research is not intended to provide an answer to why pilots are leaving, nor is it intended to provide a recommended course of action to fix the pilot shortage. This research intends to provide the reader greater insight into the relationship between airline

hiring and pilot retention by analyzing historic and future trends, including airline hiring and growth rates, Air Force pilot production, and future projections of those rates. It also takes a brief look at Air Reserve Component (ARC) pilot requirements under the new force structure. The ARC includes the Air Force Reserve and the Air National Guard. This research should give the reader a better understanding of the future impact of airline growth on pilot retention. Understanding this relationship is necessary to understand the pilot shortage problem and the impact of potential solutions.

The airline industry has traditionally relied heavily on the pool of pilots leaving the military for its supply of jet aircraft pilots. Over the last several years, the military has drastically downsized its forces, including a substantial reduction in the number of pilots. Today's Air Force contains the fewest pilots in history. At the same time, the airline industry continues to grow, increasing its demand for pilots, many of which will have military experience. The Air Force must understand the supply and demand characteristics to accurately target personnel programs designed to retain the appropriate number of experienced pilots required to maintain a proper force structure.

#### Description of the Problem

Over the last several years, adequately managing the Air Force pilot inventory against the requirement presented Air Force planners with many challenges. Recent force restructuring reduced Air Force pilot requirements while reduced pilot retention rates and pilot training production altered the inventory. In FY95 and FY96, as the Air Force experienced very high retention rates, the Air Force allowed the inventory to draw down to levels consistent with requirements. In FY97 and FY98, retention rates dropped.

Relative to current requirements, the Air Force faces a pilot inventory shortage. These problems are not new. The Air Force downsized its requirement for pilots on numerous occasions in the past, particularly following major conflicts. Airline hiring, a major determinant of pilot retention, has changed with past economic cycles and altered Air Force retention forecasts. Through each cycle, the Air Force weathered the storm and managed to produce enough pilots to man required cockpits. The future may not be quite the same as the past, however. Today, the Air Force is producing far fewer pilots, exacting longer commitments, and facing increased competition as the major airlines continue to grow.

The reduction in pilots required by the Air Force is nothing new. In 1951, the Air Force required over 55,000 pilots (Van Horn, 1998). Today, the Air Force requirement calls for approximately 14,000 pilots (Van Horn, 1998). Although most of the reductions occurred incrementally, there are three periods of accelerated reductions in requirements (see Table 1). In the five-year period from 1957 to 1962, the requirement dropped by 20%. Following the Vietnam War, the pilot requirement dropped 29% from its high of over 46,000 in 1967 to 32,400 in 1972 (Garton, 1998). During the recent force restructuring, the requirement dropped from 21,500 in 1990 to 14,863 in 1995—a 33% decrease (Garton, 1998). In terms of percentage reductions, the impact of recent reductions are greater than those following the Vietnam War. Also, the pilot reductions in the late 1950s and those following the Vietnam War were primarily reductions in pilot requirements. Prior to the reductions, pilot inventory levels had not yet reached the wartime requirement. Therefore, most of the reductions occurred on paper. Following Vietnam, for example, the actual inventory only decreased by 8%.

The Air Force manages its rated force by bringing its rated inventory into equilibrium with its rated requirement. Traditionally, the Air Force has managed its pilot inventory by changing the rate of accessions (increasing/decreasing the training of its new pilots) or by managing retention (loss rates). Both of these methods are briefly discussed. (A third method involves altering the requirements. However, future requirements are expected to remain fairly constant).

Table 1. Air Force Pilot Inventory vs. Requirements (Van Horn, 1998)

<b>Year</b>	<b>Inventory</b>	<b>Requirement</b>	<b>Year</b>	<b>Inventory</b>	<b>Requirement</b>
1955	50,067	57,100	1976T	28,017	23,500
1956	52,427	57,300	1977	26,372	23,300
1957	54,489	57,300	1978	24,913	21,900
1958	51,711	50,000	1979	22,471	23,800
1959	50,803	48,500	1980	21,896	23,000
1960	50,451	48,000	1981	22,297	23,400
1961	48,798	47,800	1982	22,814	23,700
1962	49,427	45,700	1983	23,458	23,800
1963	46,837	43,900	1984	23,901	23,600
1964	45,257	41,800	1985	24,198	24,000
1965	43,050	37,400	1986	24,210	24,200
1966	40,449	38,200	1987	23,663	23,500
1967	38,447	46,200	1988	22,819	22,600
1968	37,632	43,400	1989	21,750	22,300
1969	36,832	37,900	1990	20,917	21,500
1970	34,808	36,600	1991	19,617	19,672
1971	34,782	35,100	1992	17,890	17,157
1972	35,194	32,400	1993	16,738	15,939
1973	33,171	32,000	1994	15,963	15,207
1974	31,158	28,500	1995	15,361	14,863
1975	29,643	26,400	1996	14,774	14,365
1976	28,361	23,900	1997	14,165	14,207

Increasing or decreasing the number of pilot candidates trained each year affects the overall pilot inventory. During the drawdown, the Air Force decreased the number of pilots sent to pilot training. Today that number is increasing as the Air Force faces a shortage of pilots. Appendix A includes a complete list of pilot production, inventory,

and requirements from 1951 through 2003. During the drawdown, the Air Force also used a “banked pilot” program where newly trained pilots were sent off to a non-flying assignment until a flying position became vacant. Unfortunately, changes in demand (pilot requirements) can not be immediately met by changes in training due to the long pipeline required to select and train pilots. For example, it takes at least 18 months to accomplish pilot training and follow-on weapons system training to bring a pilot to mission ready status. It is much cheaper to retain an experienced pilot than to train a replacement. The impact of decisions to reduce pilot production today will be felt for years into the future.

Since training cannot be used to affect immediate changes in pilot inventory levels, the Air Force also manages retention through various retention policies. Active Duty Service Commitments, or simply, service commitments, incurred after pilot training have been increased to keep pilots on active duty longer. An Aviation Continuation Pay bonus (commonly referred to as the pilot bonus) has been offered to pilots who fulfill their pilot training service commitment in exchange for continued service through their 14<sup>th</sup> year of active duty. During the drawdown, the Air Force implemented a “feet on the ramp” policy where those pilots who declined to accept the pilot bonus were no longer allowed to fly. During a brief period of time as force reductions were well under way, the Air Force waived various service commitments to allow pilots to leave active duty earlier.

The Air Force monitors retention through the use of a statistic called the Cumulative Continuation Rate (CCR). The 6 to 11 year CCR, for instance, represents the percentage of pilots reaching the six-year point who are expected to remain on active duty through the 11-year point. The index intends to measure pilot retention following the

initial pilot training service commitment. Due to increasing pilot training service commitments, the 6 to 14 year CCR is becoming a more common measure in the Air Force. As a short-term retention indicator, the value of the CCR is questionable since it looks at all affected year groups, many of which are not eligible to separate. In fact, analysts have found a 21-month delay between a particular event in airline hiring and the effect felt in the active-duty pilot force (Chapman, 1997). On the other hand, the pilot bonus take rate (the percentage of eligible pilots who accept the bonus) has been found to be a key indicator of future retention (AMC Retention Update, 1998). Historically, 90% of pilots who decline the bonus request an active duty separation within two years (Chapman, 1997). Adequately managing pilot retention has proved difficult, resulting in an inventory shortfall.

The military has historically been concerned that the airlines have a detrimental effect on pilot retention. The major airlines hire a large number of departing active duty pilots. As of 1995, it was estimated that 75% of major airline pilots had military experience (Hansen, 1997). Periods of airline hiring have coincided with reduced retention rates. During the airline growth years (1985 through 1990), the major airlines hired an average of 4083 pilots per year, with about 40% of them coming from the U.S. Air Force (Garton, 1998). A 1988 Department of Defense (DoD) study projected a pilot shortage of 2900 by 1994 due to the extraordinary employment opportunities in commercial aviation (Office of the Asst Sec Def, 1988:1-6).

The shortage forecasted by the DoD study did not occur for a couple of reasons (Office of the Asst Sec Def, 1988). Shortly after the study was concluded, the Air Force drawdown began, dramatically reducing the number of pilots required by the Air Force.

Even if the original projection (of 2900 pilots) was accurate, the dramatic pilot force reduction would have left the Air Force with an overage of approximately 2100 pilots in 1994. Additionally, the airlines entered a slow-growth period during the early nineties, particularly during the years 1991, 1992, and 1993. The associated CCR, lagged by two years, increased from 26% to 45%, then 70% and 72% during those same years (AMC Retention, 1998). Ironically, at the same time the Air Force was attempting to reduce pilot inventory levels, more pilots were electing to stay on active duty.

Even as the Air Force attempted to reduce pilot inventory to match new requirements, the Air Force projected a future pilot shortage. The pilot production rate was cut to approximately 500 a year from 1994 through 1996 to help alleviate existing overages, even as studies forecasted a shortage as early as 1997 (Graf et al., 1994:40). Over the past several years, airline hiring has increased and retention rates have once again dropped. The FY1997 CCR dropped to 57%, and the pilot bonus take rate dropped to 30%—both are expected to continue to decrease (AMC Retention, 1998). The Air Force is now anticipating a shortage of approximately 2300 pilots by the year 2002, nearly 17% of the total pilot requirement (Nickles, 1998).

If past trends continue, the Air Force pilot requirement will continue to decrease while airline growth and demand for military-trained pilots continues to increase. However, as this research will show, commercial airlines will find it increasingly more difficult to hire military-trained pilots as Air Force inventories drop. The demand for the shrinking supply of Air Force pilots is likely to increase in the future. Therefore, to achieve equilibrium between future inventory and future requirements, Air Force planners must understand the relationship between airline hiring and Air Force pilot retention.



## Literature Review

A number of past studies have dealt with various aspects of the relationship between Air Force retention and airline hiring—many sponsored by the Air Force and the DoD. Although most studies provide short-term analysis, many of the economic relationships are, nonetheless, applicable to understanding long range relationships. The first of these studies analyzed the impact of perceived employment opportunities and economic variables on turnover and retention. Two studies (a DoD study and RAND Corporation study) analyzed aviator retention to answer specific leadership questions concerning pilot retention difficulties. Finally, a brief description of the Air Force's Rated Management Decision Support System is provided as a basis for understanding the methodology used to predict future Air Force inventory levels.

Many studies point to a relationship between economic variables and pilot retention rates. One such study analyzed turnover rates among enlisted service members (Steel, 1996). It looked at various economic variables as well as perceived employment opportunities among enlisted career fields. It concluded there was a strong relationship between perceived employment opportunities and high turnover rates. Although officer career fields and pilots were not included, it is likely a similar relationship exists. Two studies accomplished regression analysis between various economic variables (consumer price index, increased rates of hiring, wage rates, etc.) and Air Force pilot retention. The first of these studies concluded that there was a high correlation between economic variables (including increased hiring) and pilot retention (Cromer and Julicher, 1990). The second study concluded that economic variables could be used to estimate short-term

pilot retention rates (Guzowski, 1990). The latter study also suggested that a peer group effect may exist where younger pilots, watching older year groups leave the Air Force for airline jobs, may be more apt to leave themselves.

A doctoral thesis analyzed the effectiveness of the pilot bonus through the comparison of three different models predicting accuracy of Air Force pilot retention behavior (Ausink, 1991). One of the models was the Annualized Cost of Living Model frequently used by the DoD. Another, found to be most accurate, was the “option value” model. A significant finding in the study was the rate of bonus acceptance was far below what the DoD expected—the Annualized Cost of Living model was found to provide overly optimistic predictions of retention. Recent pilot bonus increases which have failed to stem the flow of pilots from the Air Force supports this study’s findings.

In response to a congressional mandate, the DoD commissioned a study in 1988 of aviator retention to justify its request for increased aviation career incentive pay and aviation bonuses (Office of Asst Sec Def, 1988). This study included strong analysis in support of the conclusion that increases in flight pay and bonuses could solve the retention problem occurring at the time. Specifically, the aviation bonus offered to pilots in exchange for service through the 14<sup>th</sup> year of active duty was expected to improve retention by 400 pilots per year, thereby lessening the impact of the 2900-pilot shortage expected by 1994 (Office of Asst Sec Def, 1988:1-6).

In 1994, the Defense Manpower Research Center, part of the RAND Institute, completed a study on the assessment of pilot requirements (Graf et al., 1994). This study was prompted by projections of Air Force pilot shortages even as the service coped with existing pilot overages. It was the first study accomplished after the bulk of military

drawdown actions resulting from early 90's force restructuring were accomplished or well under way. This research also looked at the effect of civilian airline demand on the military, historical personnel trends, and how and why Air Force pilot requirements were changing. The study concluded that FY97 inventory projections equaled the requirement (no shortage), and that there would be a shortage of 800-1200 pilots in 2002 (Graf et al., 1994:xii). Of all literature reviewed, the RAND study was most similar to current conditions. However, there are significant differences. The RAND study took a short-term view of the upcoming pilot shortage and concluded the Air Force would have no problem meeting its demand through 1997. Additionally, the RAND study was accomplished prior to today's airline hiring boom and prior to the current pilot shortage.

The Rated Management Decision Support System is a computer simulation model used by the Air Force to project future year's pilot inventory. The output is compiled into a report called the "redline/blueline report" which shows the pilot inventory line compared with pilot requirements. Together, they determine future shortages and overages of pilots. An example of the "redline/blueline" report is shown in Figure 1.

This computer simulation model takes the actual rated inventory at the end of the previous fiscal year and exposes it to a simulated personnel life cycle and produces the output of the new, estimated, rated inventory for future fiscal years (Willits, 1997). Each pilot is modeled as a separate entity with about 30 different attributes. Many of these attributes change as the model progresses from one time period to the next. The model uses probabilities based on historical performance to make decisions. For example, to determine if a pilot or navigator separates during a particular fiscal year, the model draws

a random number and compares it to the loss rates found in the rates input file. The rates contained in the rates input file are manually updated based on historical performance.

Although the Rated Management Decision Support System forecasts are becoming more accurate as Air Force analysts gain hands-on experience, the model is based on manual input of trend statistics such as bonus take rates, retention rates, and airline hiring forecasts. The reliability of this model's inventory projections is subject to the Air Force's ability to accurately predict these rates. Nonetheless, the Air Force relies heavily on the "redline/blueline" report for rated personnel planning.

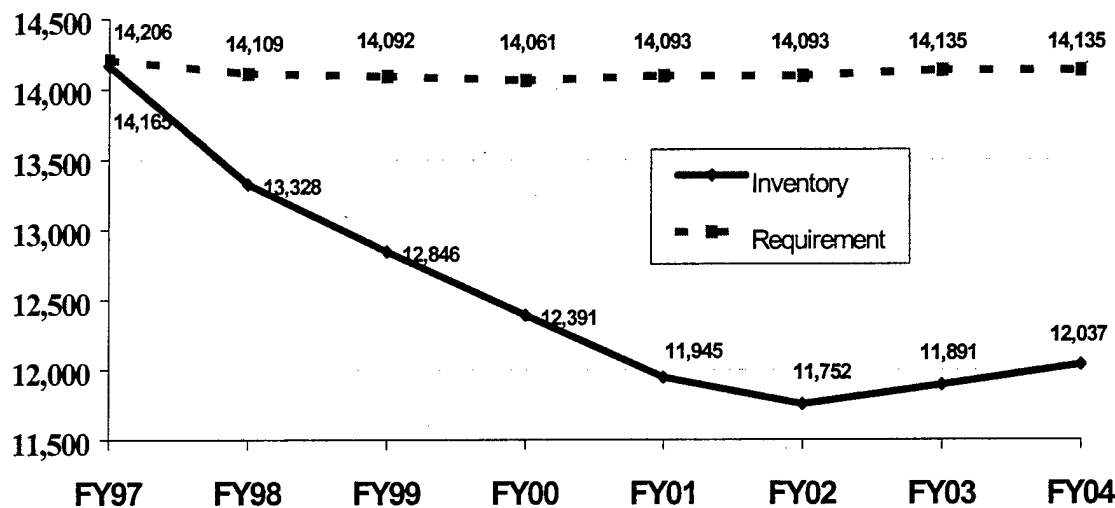


Figure 1. Redline/Blueline Report (Nickles, 1998)

### Methodology

The intent of this study is to provide the reader an understanding of major airline hiring characteristics and their relationship to pilot retention in the Air Force.

Understanding this relationship and the airlines' strong desire to hire the more experienced, military-trained pilot will provide insight into future retention challenges.

Due to the growth patterns of the airlines and pilot reductions in the Air Force, airline demand for military pilots is likely to be far greater in the future than it is today.

The overview was intended to provide a background understanding of the retention problem facing the Air Force. Chapter II will detail past hiring characteristics of the major airlines and why they prefer the military-trained pilot. Chapter III provides an understanding of the nature of pilot supply to the major airlines, including both the military pilot and airlines' other source of supply, the civilian pilot. Chapter IV looks at future airline pilot requirements, growth projections, and pilot retirements to provide the reader an understanding of airline needs. Finally, Chapter V ties past airline hiring characteristics, major airline pilot requirements, and Air Force pilot availability together. This chapter also looks at future ARC hiring requirements compared to the future number of eligible active-duty pilots. Tying the projections together should provide long-range insight into future retention problems created by airline demand. The recommendations and conclusions summarize previous chapters and provide other pilot retention considerations based on data from the paper.

## II. Past Major Airline Hiring Characteristics

### Overview

Understanding past hiring characteristics provides insight into the dynamics underlying airline demand for military pilots. The focus of this study is on hiring by the major airlines because they account for a high proportion of total pilot employment and total passengers flown. This dominance is explained in the first part of this chapter. Past hiring characteristics are then explored. These include comparisons with minimum and actual hiring standards as well as the past reliance on the military pilot to satisfy these standards. The final section of this chapter briefly looks at the influence of smaller airlines (national and regional). Since most of the non-military pilots hired by the major airlines come from this source, their hiring characteristics will aid in understanding pilot growth patterns and relative experience levels.

### Who Are The Major Airlines?

The Federal Aviation Administration (FAA) divides airlines into groups based on airline revenue performance. The major airlines are the largest of this group. The major airlines, by definition, each have annual operating revenue of \$1 billion or more per year (Department of Transportation, 1994). Currently, the 13 airlines considered major airlines include: Airborne Express, Alaska Air, America West, American, Continental, Delta, Federal Express, Northwest, Southwest, TWA, United, UPS, and US Air (Darby and Gradwohl, 1997:122). Three of them (Airborne, Federal Express, and UPS) are cargo air carriers while the remainder are passenger carriers.

The major air carriers hire most of the pilots and fly most of the revenue passenger miles in the airline industry. In 1995, the airline industry employed 71,000 pilots (Shriver, 1995). The major airlines employed 52,000 (73%) of those pilots (Proctor, 1996). The top four airlines (American, United, Delta, and Northwest) account for 67% of all revenue passenger miles and all of the major airlines account for 90% of all revenue passenger miles flown in the United States (Davis, 1996). As these numbers show, although many smaller airlines exist, most of the flight activity occurs among the major airlines. Most importantly, however, as the next section will show, the major airlines hire most of the Air Force pilots who leave active duty. Therefore, it is reasonable to limit the analysis of this study to the major airlines.

#### History of Hiring Standards and Dynamics

The major airlines have historically preferred military pilots over civilian-trained pilots. Both the method of training and amount of flight experience contribute to this preference. A review of the major airline hiring preference is required because “civilian hiring of U.S. military pilots is often cited as the central problem in management of U.S. military pilots, specifically with respect to retention” (Graf et al., 1994:x). Following a review of reasons for the preference of hiring military pilots, this section provides historical view of the degree of experience differentials between military and civilian pilots as well as the actual number of military and Air Force pilots hired.

The airlines, just like many other industries, want to hire the best-qualified candidate for the job. According to Future Aviation Professionals of America’s 1991 *Pilot Training Guide*, “Major and national airlines hire the best pilots in terms of quality

flying experience, health, and education” (Department of Transportation, 1993:15). A RAND Corporation study cited serious concerns with civilian pilots relating to training and experience. Also, military pilots are preferred because the typical military pilot simply has more experience than the average civilian-trained pilot, and the military has well-developed, highly demanding, and standardized training programs (Levy, 1995:13). Civilian pilots are trained by one of any number of instructors, each with his own training techniques. This results in a lack of standardized training and training quality. Hence, the major airlines have demonstrated a preference for hiring more of the known quality, the military pilot (Rek, 1987).

Although pilots must meet well-defined minimum qualification criteria, past major airline hiring preferences show that their new pilot hires typically far exceed the minimum standards. The minimum requirement to be hired by a major airline is a commercial pilot’s license and 200 hours of flying time (Greer et al., 1992:7). However, the major airlines have a history of preferring additional qualifications including, but not limited to, total flying hours in proportion to age, jet hours (versus turboprop hours), a four-year college degree, and an Air Transport Pilot license, which is required to fly as a Captain for the major airlines. Experience among airline new-hires varies from year to year as the rate of hiring changes from year to year. In 1991, for instance, 2404 pilots were hired with an average of 3347 total hours and 1811 jet hours. About 75% had four-year college degrees, and 86% had an Air Transport Pilot certificate at an average age of 33 (Greer et al., 1992:8). In 1996, 2661 pilots were hired by the major airlines with an average of 5191 total hours and 1767 jet hours. 87% of them had four-year college degrees and 97% had an Air Transport Pilot certificate at an average age of 34 (Darby and



Gradwohl, 1997:122). The typical Air Force pilot eligible to leave active duty after their initial pilot training commitment (nine years of service) could easily accumulate over 1800 jet hours.

The military has, traditionally, been the foremost supplier of pilots filling major airline hiring needs. During most years, 90-95% of the military pilots hired came from the Air Force and the Navy (Greer, et al., 1992:9; Darby and Gradwohl, 1997:122). This certainly makes sense, since the Army, Marines, and the Coast Guard have few fixed-

Table 2. Source of Major Airline New-Hires (Garton, 1998).

<u>Year</u>	<u>Major Airline New-Hires</u>	<u>Military Pilots</u>	<u>Air Force Pilots</u>	<u>AF Percentage of Total</u>	<u>AF Percentage of Military</u>
80	851	706	313	36.8%	44.3%
81	1116	759	348	31.2%	45.8%
82	983	602	289	29.4%	48.0%
83	312	170	67	21.5%	39.4%
84	1088	601	304	27.9%	50.6%
85	4544	2118	1150	25.3%	54.3%
86	3357	1582	924	27.5%	58.4%
87	3958	2612	1513	38.2%	57.9%
88	3328	2773	1775	53.3%	64.0%
89	5868	3902	2743	46.7%	70.3%
90	3446	2526	1804	52.4%	71.4%
91	2404	1911	1359	56.5%	71.1%
92	1876	1587	1238	66.0%	78.0%
93	463	426	295	63.7%	69.2%
94	1266	957	682	53.9%	71.3%
95	2377	806	416	17.5%	51.6%
96	2661	958	584	21.9%	61.0%

wing pilots, and most of their fixed-wing aircraft are smaller turboprops. In 1995, the army had only 800 fixed wing pilots and the Coast Guard only 300 fixed wing aircraft (Hudson, 1995). By contrast, the Air Force and Navy produce the overwhelming majority of jet aircraft time desired by airlines. The Air Force portion of the military

pilots hired averaged 66% over the last ten years--approximately twice the Navy portion (same proportion of Air Force vs. Navy inventory). Table 2 displays the number of pilots hired by the major airlines over the last 17 years, the number of Air Force pilots hired, and the Air Force's percentage of military and total pilots hired.

The percentage of major airline new-hires with military experience has varied over the years. Studies have shown a strong, inverse correlation between the level of pilot hiring and the number of new-hires with military experience. When the number of pilots hired is low, the percentage with military backgrounds is high and, conversely, when the number of pilots hired is high, the percentage with military backgrounds is lower (Hansen and Oster, 1997). Figure 2 displays the total number of airline new-hires over the past 17 years. Figure 3 shows the percentage of airline new-hires with military experience as well as the percentage with Air Force experience. Air Force pilots have traditionally accounted for approximately two of every three military pilots hired, which is in line with the ratio of Air Force to Navy pilot requirements (Air Force and Navy pilots account for nearly all military pilots hired by the major airlines). For the seven-year period from 1988 through 1994, the Air Force accounted for over half of all airline pilots hired. Also, when airline demand shrank in 1991, the military supplied over 90% of pilots hired. As demand increased in 1995 and 1996, the percentage of new-hires with military experience dwindled. Due to the decreasing number of military pilots, the military-trained pilot will account for a smaller portion of future airline new-hires.

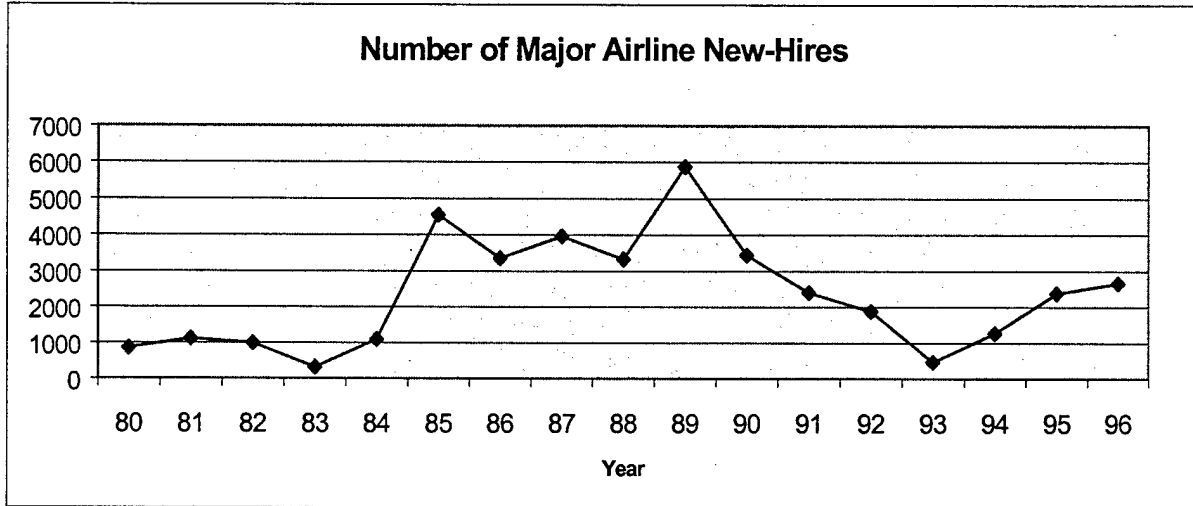


Figure 2. Number of Major Airline New-Hires (Garton, 1998)

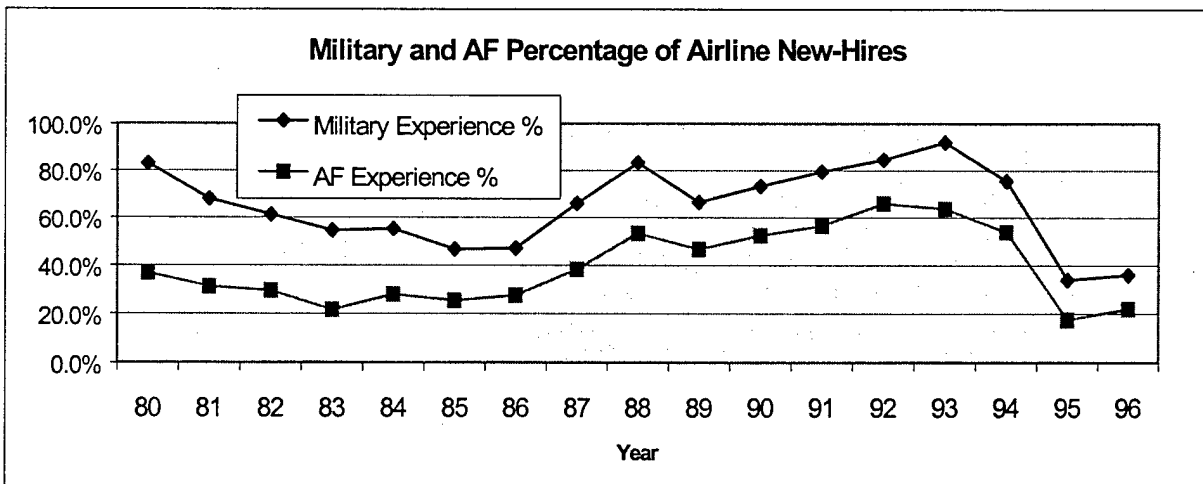


Figure 3. Military and Air Force Percentage of Airline New-Hires (Garton, 1998)

### Influence of National/Regional Airlines

Although the major airlines hire most departing Air Force pilots, the smaller, national and regional airlines hire a greater number of pilots than the majors. They make up the remainder of the major airline's hiring pool. A highlight of differences between pilots hired by smaller airlines and major airlines will aid in understanding the

desirability of Air Force pilots. The relative size of smaller airlines, number of pilots hired, and the relationship between experience levels and hiring trends will be examined.

The national and regional airlines are more numerous and hire more pilots than the major airlines but employ far fewer pilots. 1991 data are typical. In that year, the airline industry employed 67,739 pilots, of which over 51,000 were employed by the major airlines (Greer et al., 1992:14). The pie chart (Figure 4) displays the relative percentages. Although they employ fewer pilots, these small airlines usually hire at least

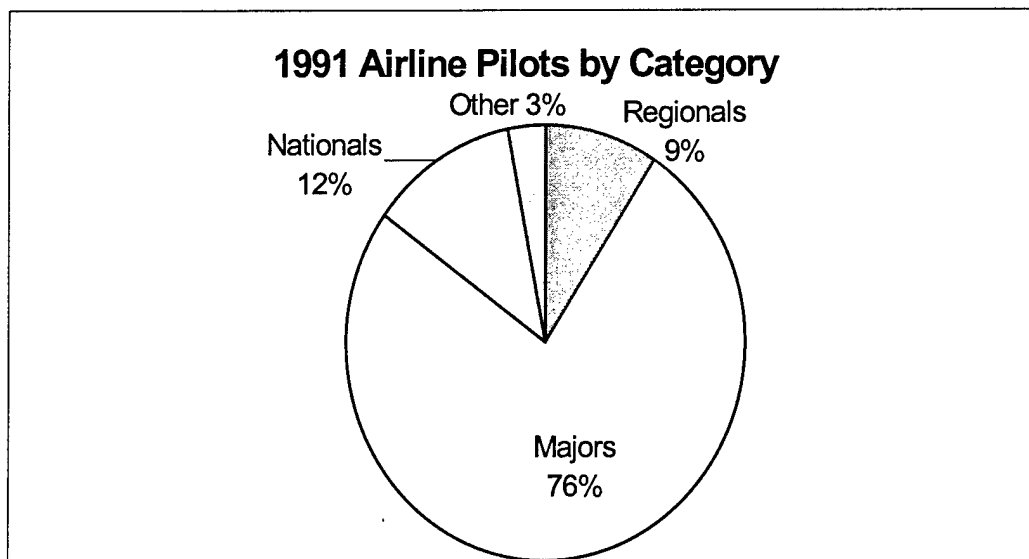


Figure 4. 1991 Airline Pilots by Category (Greer et al., 1992:13)

as many pilots as the majors. In 1991, the major airlines accounted for 40% of new airline jobs while national and regional airlines accounted for 50% (Greer et al., 1992:14). Since pilot salaries are much higher among the major airlines, pilots use the national/regional airlines as a stepping stone for their own advancement.

Smaller airlines generally experience a "trickle down" effect from major airline hiring. When hiring is high at the majors, pilot qualification levels at the smaller airlines decline. When hiring is slow, qualification levels at the smaller airlines increase. In

1989, a heavy hiring year for the major airlines, the new hire for the national airlines averaged only 217 jet hours (Statistics, 1992). Since turnover rates are much higher among the smaller airlines, high rates of hiring translate into fewer jet hours among the pilots ultimately hired by the major airlines as well. This is likely to give the experienced military pilot a hiring edge.

### Summary

The major airlines fly the vast majority of revenue passenger miles and employ nearly 75% of all airline pilots. They have displayed a history of preferential hiring, preferring the military-trained pilot to the civilian-trained pilot. During slow hiring periods, a higher percentage of major airline new-hires have military experience. The Air Force pilot accounts for approximately two of every three military pilots hired. From 1988 through 1994, the Air Force pilot accounted for over half of all major airline pilots hired. During peak hiring periods, a lower percentage of new hires have military experience simply because there are not as many military pilots available. The remainder of major airline new hires come from civilian sources, typically the smaller national/regional airlines. Although smaller airlines employ fewer pilots, they hire at least as many as the major airlines due to the high rate of turnover, particularly when the major airlines are in peak hiring periods. These peak hiring periods drive down the relative experience levels making the military-trained pilot a more desirable resource.

### III. Nature of Pilot Supply to the Major Airlines

#### Overview

Pilots hired by the major airlines have basically two “growth” options from which to gain flying experience. They either fly with the military or gain experience through the civilian sector. In the later case, this means flying for either national/regional airlines or corporate flight departments. This chapter will review some of the characteristics and trends of the military and civilian flyer. Military pilots, of course, gain years of experience flying multi-engine or high-performance aircraft (mostly jet) before becoming eligible to leave active duty. The civilian pilot, on the other hand, continually looks for opportunities to gain flight experience and pay. They either end up landing the ultimate job with a major airline or giving up on an aviation career. It is important to analyze general aviation trends because the availability of these pilots for future hire by the major airlines will affect the airlines’ desire to hire from their other primary source, the military pilot.

#### The Military Pilot

The recent downsizing of the military has drastically reduced the number of pilots in the DoD. The Air Force employs the majority of these pilots. Although the Air Force has traditionally had difficulty managing its pilot force, this period has proved exceedingly difficult for personnel planners to manage. The Air Force used a number of different incentive programs in its attempt to keep pilots when it wanted them and to reduce pilot inventories when it did not want them. These programs have included

increasing service commitments, varying pilot assessments to Undergraduate Pilot Training (UPT), increasing the size of the pilot bonus, instituting a "feet on the ramp" policy, instituting a bank pilot program, waiving service commitments, and altering the pilot bonus program. Through the last 10 to 15 years, these programs have been shortsighted, lacked consistency, and proved mostly ineffective. This section provides a chronology of the various programs and the current programs in place.

Gradual increases in UPT service commitments and the introduction of the pilot bonus were the first of many steps designed to help control the pilot inventory. In 1988, the DoD performed an aviator retention study (mandated by Congress) to justify an Aviator Continuation Pay bonus designed to entice Air Force pilots to stay on active duty through the 14<sup>th</sup> year of service (Office of the Asst Sec Def, 1988). At the time, the Air Force estimated a 2900-pilot shortage by 1994. The new pilot bonus took effect in 1989 and included an offer to pilots, at the completion of their UPT service commitment, of up to \$12,000 per year in return for continued active duty service through their 14<sup>th</sup> year. Affected pilots, at that time, held six-year service commitments after attending the one-year UPT program. The \$12,000 annual bonus entailed seven additional years of service commitment to affected pilots. Pilots who attended UPT later in their careers were offered lesser amounts. The \$12,000 per year bonus program failed to entice as many pilots as the DoD projected (Ausink, 1991).

Prior to the \$12,000 annual bonus, the Air Force increased pilot training service commitments from six to seven years. This increase affected pilots entering UPT in 1987 and graduating UPT in 1988. These pilots later became eligible to leave active duty in 1995. Unknown at the time, this increase would become effective in the midst of the

pilot force reduction. One year after the service commitment was increased from six to seven, the Air Force again increased commitments from seven to eight years. The earliest pilots affected graduated pilot training in 1989 and recently became eligible to leave active duty in 1997.

Soon after the Air Force increased UPT service commitments, the collapse of communism forced the beginning of the force drawdown. The Air Force produced nearly 1500 pilots in 1991 and held commitments to send future ROTC graduates and AF Academy graduates through pilot training in subsequent years. In response to these demands, the Air Force reduced UPT accessions and began the "pilot bank" program in which newly trained pilots were sent off for one tour in a non-flying job while awaiting cockpit openings. The Air Force sent pilots into these jobs from 1991 through 1993. These pilots have eight-year UPT service commitments that will expire between 1999 and 2001. The pilot bank and reduced UPT accessions were not enough to bring about the desired pilot force reductions.

During subsequent years of force reductions, the Air Force began other programs. One of these programs was the Pilot Early Release Program. This program waived various service commitments for pilots in selected year groups. This allowed many pilots to leave active duty much earlier than they would otherwise have been able.

Another program was the Bonus Eligible, Non Taker program, commonly known as the "feet on the ramp" program. The "feet on the ramp" program was much more controversial. This program allowed commanders to distribute limited flying time to those pilots who intended to stay on active duty. Pilots eligible for the pilot bonus (following the UPT service commitment), who elected not to accept a service



commitment through their 14<sup>th</sup> year, were grounded and not allowed to fly. Since they were not allowed to fly, more flying time was available to train and season remaining pilots. Many of the grounded pilots retained other service commitments from major weapons system training or PCS moves. Some filled non-flying positions at their units while others were PCS'd to less desirable locations. In effect, the program became a punishment for those pilots who elected not to accept the pilot bonus. Additionally, the "feet on the ramp program" increased bonus take rates as many pilots unwillingly accepted the bonus out of fear of not getting hired by the airlines as a non-current pilot.

The Air Force also cut pilot assessions by reducing the number of pilots attending UPT. Training was rapidly cut from over 1500 pilots per year in 1990 to approximately 500 pilots per year from 1994 through 1996 (see Table 3). During the five-year period

Table 3. UPT Pilot Production 1988 – 1999 (Van Horn, 1998)

<u>Year</u>	<u>UPT Production</u>
1988	1510
1989	1581
1990	1581
1991	1468 (384 Banked)
1992	974 (364 Banked)
1993	749 (329 Banked)
1994	533
1995	480
1996	523
1997	673
1998	900
1999	1025

from 1993 through 1997, the Air Force produced an average of 592 pilots per year. The low rates of pilot production certainly aided the force drawdown efforts, but they also

contribute to today's pilot shortage situation. The full impact of these low production years will be looked at more closely later in this paper.

The various programs instituted during the force drawdown helped the Air Force to manage its pilot force magnificently, better than most periods in Air Force history. If you revisit Table 1, you can easily see that the inventory during the drawdown was seldom more than 500 pilots above the requirement, and during many years, discrepancies were within a couple hundred pilots. During this period, various Secretary of Defense sponsored studies (two of them by the RAND Corporation) pointed to pilot shortages after 1997 (Levy, 1995). One in particular estimated a 1200-pilot shortage by 2002 (Graf et al., 1994:xii). Yet, no attempt was made to overman pilots during the drawdown to offset the pilot shortage. Today, the Air Force is expecting a shortage of 781 pilots during fiscal year 1998 increasing to 2341 pilots by 2002 (Nickles, 1998).

Only recently has the Air Force reacted to the impending shortage. The pilot bonus was increased to a maximum of \$22,000 per year in exchange for continued service to the 14-year point (five additional years). Since increased UPT service commitments delay the point at which pilots become eligible, five years is now the maximum amount of time a pilot accepting the full bonus increases his/her commitment. Additionally, the new program adds flexibility by allowing pilots to choose a one-year, two-year, or three-year commitment in exchange for a reduced annual bonus in the amount of \$6,000, \$9,000, and \$12,000, respectively (Jordan, 1997). Once again, however, the increased pilot bonus is failing to keep more pilots in the Air Force (AMC Retention Update, 1998). Additionally, more pilots between 10 and 11 years of service are writing letters to

the major's promotion board requesting not to be promoted, allowing them to leave active duty earlier than their bonus commitment otherwise allowed (Bird, 1998).

The various retention programs attempted by the Air Force lack consistency and a long-term focus. Most of the programs attempting to keep pilots in the Air Force involve throwing money at the problem. So far, they have not worked. The long-term bonus take rate decreased from 64% in FY95 to 34% in FY97 and is down to 28% through March of 1998 (AMC Retention Update, 1998). The bonus take rate is a valid predictor of retention—i.e., 90 % of those who decline the bonus request a separation within two years (Chapman, 1997). Many other Air Force programs and policies, too numerous to detail in this research, have adversely affected retention. Some of these include the Selective Early Retirement Boards, limitations on field grade officers in the units, return to fly boards, increased operations tempos, deep cuts in military retirement programs, cuts in health benefits, and inadequate family housing.

Lack of continuity between various Air Force retention policies in the face of continued airline demand for pilots can only have one outcome--most of the Air Force pilots eligible to leave active duty will be available for hire by the major airlines. However, from the airline's perspective, future year groups have a decreasing number of pilots. Therefore, fewer pilots will be eligible to leave active duty. Additionally, increased service commitments from six to eight years have effectively left "empty" years of military pilot availability for the airlines, the last "empty" year having been 1997 (eight-year UPT service commitments began in 1989). If the airline industry had another reliable source of pilots, it could reduce its demand for the Air Force pilot. However, as the civilian aviation picture will show, this is not likely to be the case.

### The Civilian Pilot

The major airlines will continue to hire the appropriate number of pilots to fulfill their needs. If those pilots are not available from the military, they will get them from the civil aviation community. Generally, these pilots fly their way up the ladders of civil aviation, progressing from general aviation to commuter operations, and on to regional and national airlines. If a significant population of these pilots existed, the major airlines could offset hiring the experienced military pilot by hiring experienced civil aviation pilots. However, although smaller airlines are more numerous than in the past, fewer pilots are electing to begin the general aviation route, primarily due to the increasing cost of flight time. The civilian sector has been plagued with high aircraft manufacturer liability. This has made flying more expensive. A typical pilot with only civilian experience will fly on his/her own until getting hired by a regional carrier or a corporate flight department. The cost of flying your way up the ladder is expensive, time consuming, and fewer pilots are taking that route.

A pilot must accumulate enough hours to entice an airline, even a small, regional carrier, into hiring him/her. Even as an instructor, pilots earn very little income. In 1994, the airlines with turboprop aircraft hired 67% of their pilots from general aviation. Of the total hired, 80% had civilian-only experience with an average of 2401 flying hours (Statistics, 1995). In 1992, the estimated cost of flying your way from student pilot through the ranks of instrument ratings, instructor pilot, multi-engine ratings, and on to an ATP certificate exceeded \$31,000 (FAPA, 1992).

Although Congress limited the liability for small aircraft manufacturers in the early 90s, forecasts for general aviation include slow growth following years of decline. The number of general aviation hours flown peaked at over 40 million in 1980 and

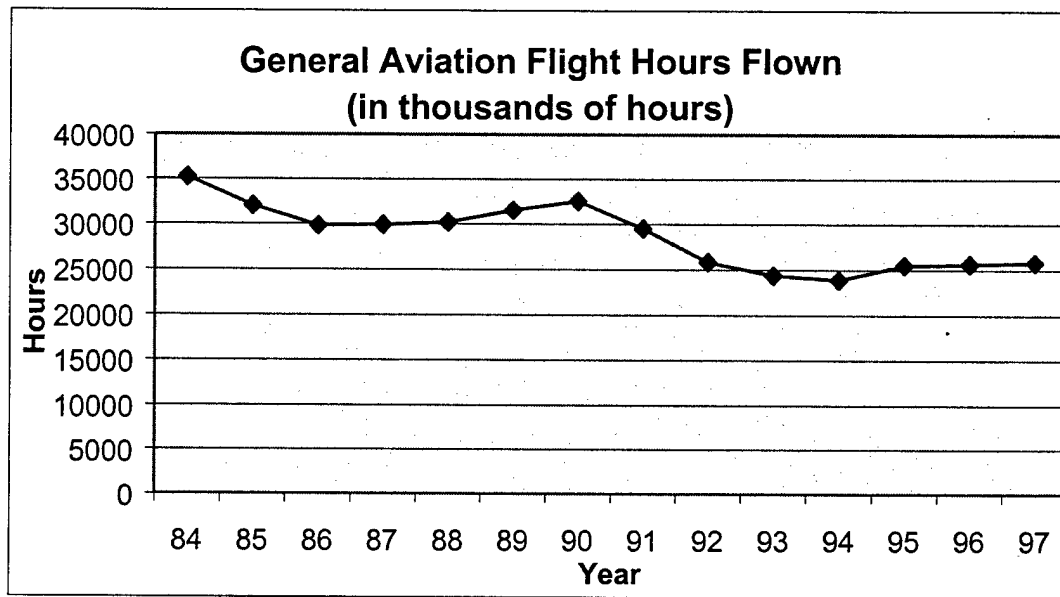


Figure 5. General Aviation Flight Hours Flown (FAA, 1997:v-7)

gradually decreased to a low of just under 25 million hours in 1994 (FAA, 1997:v-7). In 1996 and 1997, the number of general aviation hours flown increased slightly (see Figure 5), and the FAA estimates a mere .7 % increase over the next 12 years (FAA, 1997:v-18).

Not only have the number of flight hours fallen off since the early 1980's, but the number of commercial and private pilot certificates has also fallen. The number of private pilots decreased by approximately 28% from 1980 to 1996 (see Figure 6) and is not expected to rebound until 1998 (Dept of Commerce, 1997). The FAA's 12-year forecast estimates private pilot growth at .8 % and commercial pilot growth at .5 % (FAA, 1997:v-18). ATP certificated pilots have increased due to the increase in the

number of major airline pilots. Although not technically required, nearly all pilots hired by the major airlines hold ATP certificates.

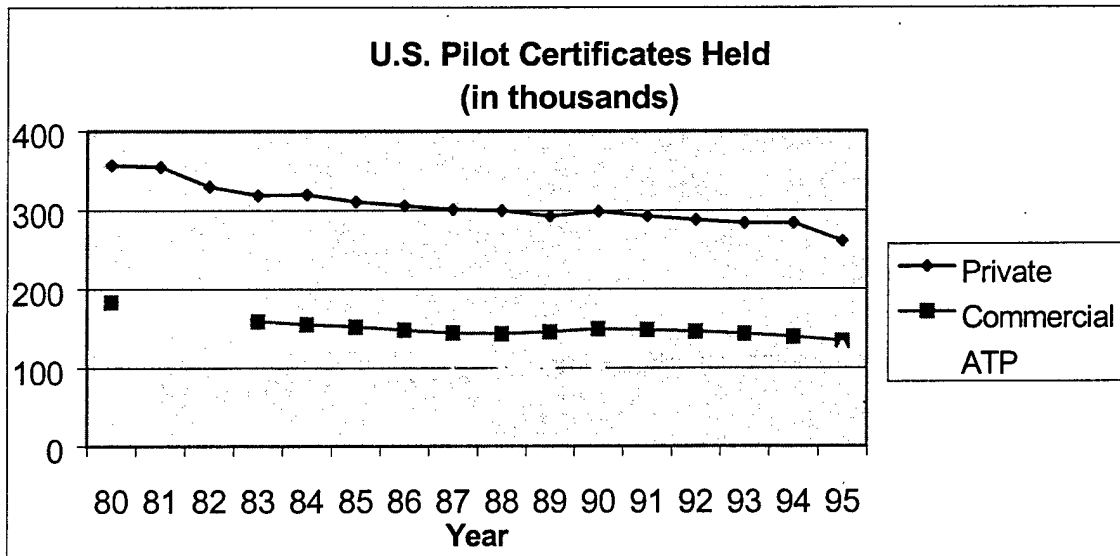


Figure 6. U.S. Pilot Certificates Held (Dept of Commerce, 1997)

If the general aviation community is expected to fill the demand for future major airline hiring requirements, a higher percentage of general aviation pilots will have to make aviation careers and continue on to gain ATP certificates. The major airlines cannot count on significant new numbers from this area to fill their hiring requirements. Given that the airlines will ultimately hire the number of pilots they require and the military supply will not be nearly as plentiful as in the past, airlines will hire more civil aviation pilots at the expense of decreased experience levels.

#### Summary

The major airlines have two sources of available pilots to fill their hiring requirements—the military pilot and the civil aviation pilot. The Air Force supplies about two-thirds of these military pilots. The airlines had plenty of military pilots to

choose from during the force reduction years. The Air Force is attempting to increase retention through a number of programs including increased pilot training service commitments and increased pilot bonuses, but their efforts have failed to stem the tide of pilots leaving active duty. Despite the low Air Force pilot retention, the number of military pilots available for airline hiring will dwindle in future years due to much smaller year groups trained by the Air Force. Additionally, UPT service commitments, which increased to eight years in 1989, are only now impacting the airline supply by effectively leaving an "empty" year of Air Force pilot availability.

The remainder of major airline hiring needs will be filled by the civil aviation pilot. The number of private and commercial pilots and the number of general aviation hours flown dropped for many years. Over the next 12 years, they are only expected to increase by small margins. The airlines, therefore, will be forced to accept less experienced civil aviation pilots to fill their hiring needs. Air Force pilots who elect to leave active duty for hire by the major airlines will offer more experience (due to longer UPT service commitments) than their predecessors and will likely continue to be in high demand by the major airlines.

#### IV. Future Major Airline Pilot Requirements

##### Overview

Future major airline pilot requirements will be the single-most determining factor on their demand for Air Force pilots. As the largest supplier of pilots to the major airlines, the Air Force should be aware of airline pilot requirements. This chapter details the airlines expected need for pilots well into the future. This need stems primarily from increasing demand for air travel, both passenger and cargo. Of course, other factors can influence airline's needs for pilots. Some of these influencing factors are discussed, including the move to smaller aircraft, aircraft conversions from three-person to two-person cockpits, and the impact of new airline alliances. Mandatory pilot retirements will also affect future major airline pilot requirements. Each of these areas will be discussed in this chapter. Additionally, economic fluctuations will influence short-term demand. Therefore, this research relies on long-term estimates. This chapter's summary consolidates the major airlines' expected future pilot requirements from conservative estimates of growth forecasts as well as mandatory pilot retirements.

##### Forecast Growth Rates

Demand for air travel is divided into two broad categories: passenger travel and air cargo (which includes airfreight and express cargo). Passenger travel has increased substantially since its inception early this century. However, the domestic passenger market is becoming more mature and future growth rates are expected to be more moderate. The air cargo business, on the other hand, is much less mature and is expected



to continue to grow substantially well into the future. Internationally, the market for both passenger and air cargo was expected to be a growth industry well into the next century.

The current Asian financial crisis is expected to slow this boom in the short term.

However, long-term forecasts still include healthy demand. Each of these areas is discussed in this section, with comparisons between historic trends and current forecasts.

Historically, the rate of increase in demand for pilots outpaced two measures of passenger demand (revenue passengers enplaned and revenue passenger miles flown). But, it has underperformed the rate of increase in air cargo miles flown. The most recent data available is from the 1997 *Statistical Abstract of the United States*. However, it only includes figures through 1995—growth trends over the past two years are not included (Dept of Commerce, 1997). During the 11-year period from 1985-1995, total flight personnel in the scheduled airline industry increased at an annual rate of 4.3% (40,000 to 64,000) without a decrease during any year. The rate of increase of revenue passengers enplaned and revenue passenger miles flown were both very similar at approximately 3.5%. The only decrease of these two measures occurred in 1991 (the year of the gulf war). The number of air cargo miles also dropped slightly during 1991, but posted an astounding 8.3% rate of increase during the 11-year period. The rate of increase in pilot demand slightly outpaced increases in passenger travel demand, but underpaced demand for air cargo. Future increases in passenger travel and air cargo are not expected to mirror the past. However, growth of pilot demand relative to air travel demand will likely retain similar rates of increase.

Estimates for airline growth are found in a number of sources which may all look at different time periods. Economic swings will certainly impact short-term projections

of demand; therefore this research concentrates on long-term (i.e., 10 year) indicators. Additionally, other factors can impact future demand for air travel and, therefore, airline demand for pilots. Some of the factors are discussed in the following section of this chapter. Nonetheless, estimates for future demand for air travel are readily available.

All indicators point to continued growth in passenger air travel, especially in the international market. The FAA estimates revenue passenger miles for U.S. carriers will increase 4.6% from now through 2008 (4.2% domestic and 5.8% international) while passenger enplanements will grow at 4.1% (3.9% domestic) over the same time span (FAA, 1997:III-34). More importantly, the FAA estimates the U.S. air carrier fleet size to grow at an annual rate of 3.5% (FAA, 1997:III-40). A growing fleet requires a similar increase in pilots to fly the aircraft.

Other forecasts indicate similar rates of increase. Airbus Industrie's 20-year global forecast anticipates revenue passenger miles to increase by 5.2% annually (only 1.9% in the mature U.S. domestic market) with slightly loftier rates of increase through 2006 (Airbus Industrie, 1997). They also forecast the worldwide aircraft fleet size to grow by 3% annually over the 20-year period. Additionally, the International Air Transport Association recently revised its growth forecasts downward (due to the Asian financial crisis), but they still expect a healthy 5.4% annual increase in global passenger demand through 2015 (Shifrin and Perth, 1998). In addition to the U.S. domestic market, U.S. major carriers account for a significant portion of worldwide passenger travel.

Growth in cargo traffic is expected to be much stronger than the passenger business, but again, not as strong as the 8.3% growth witnessed from 1985 through 1995. The International Air Transport Association scaled back its five-year average annual

growth rate forecast for cargo to 6.4% from 9%, and they scaled back their 15-year forecast to 6.1% (Shifrin and Perth, 1998). Boeing also predicts a tripling of world cargo traffic by 2015, a 6.7% annual rate of increase (Fiorino, 1998). Boeing also points out that passenger aircraft carried 60 % of cargo traffic in 1996, but they expect freighter aircraft to pick up much of the cargo increase through 2015 (Fiorino, 1998). Currently, the three major airlines dedicated to cargo (FedEx, UPS, and Airborne Express) account for 14% of all aircraft among the major airlines (Big 13 Fleet, 1998).

Combining passenger and cargo forecasts suggests that the airline industry will continue to grow well into the future. Economic cycles may put a temporary damper on growth and alter short-term outlooks. Long term outlooks, however, suggest that the industry will continue to require a growing number of pilots. However, passenger and cargo growth is only a part of the picture. Other factors will influence the airlines' need for pilots.

#### Other Factors Influencing Demand

In addition to the cyclical economy, other factors will influence the airlines' need for pilots. Flying smaller or larger capacity aircraft will increase or decrease the number of pilots needed, given constant passenger demand. Conversions from three-person cockpits to two-person cockpits will reduce the number of pilots required. Airlines that make their operations more efficient can reduce their pilot requirements. This section reviews the likely impact of each of these areas on the overall pilot requirement.

Aircraft size has an important effect on pilot requirements. Given a stable demand for passenger miles and similar load factors, larger aircraft can move more

passengers. This reduces the number of pilots required. A recent trend in the U.S. market, however, involves major airlines moving to smaller aircraft. In 1996, Delta and United approved pilot contracts allowing the airlines to add low-cost carriers to their fleet (Ho, 1996). Both Delta and United are hoping to increase market share by taking away markets held by commuter airlines. The move to smaller aircraft is in line with FAA estimates which forecast the largest increase in number of aircraft through 2015 to occur in the two-engine, narrowbody aircraft category (FAA, 1997:III-40). This trend will add more pilot requirements than would otherwise be required by normal passenger growth.

The move from three-pilot cockpits to two-pilot cockpits is expected to have the reverse affect. Today's more modernized aircraft, such as Boeing's 757, 767, and 777, maintain passenger capacity while requiring only two pilots to fly the aircraft, thus eliminating the flight engineer, or second officer position. This conversion has been going on for quite some time. Some of the older aircraft, such as DC-8's, DC-10's, Boeing 727's, and Boeing 747-100's, still require the third pilot (see Appendix B). Today, however, less than 20% of major airline fleets are comprised of these aircraft, mostly the Boeing 727 (Big 13 Fleet, 1998). The continued conversion to modern, two-pilot aircraft will moderate the requirement for additional pilots, but the conversion will continue to be slow-paced as some airlines keep three-cockpit aircraft well into the next century.

As an airline becomes more efficient, it can move more passengers with a given number of pilots. Over the past several years, the major airlines have increased average passenger load factors to nearly 69% (FAA, 1997:III-31). This indicates dramatic increases from the 1985 through 1993 years where load factors stayed nearly steady

between 60.3% and 61.3 % (FAA, 1997:III-31). Past 1998, however, the FAA expects major airline fleet capacity to catch up to demand and forecasts load factors to drop back to 68% through 2016 (FAA, 1997:III-31). In addition to load factors, recent Associated Press news articles presented numerous proposals among the major airlines to form alliances (Edwards, 1998). Proposed airline alliances between United and Delta, Northwest and Continental, and American and US Air, involve mergers of various programs including sharing of routes and selling seats on each other's airplanes. These new alliances may alter previous forecasts and offer airlines alternatives to move to larger aircraft and higher load factors on given routes. If the alliances actually take effect, the airlines may see a small reduction in their rate of increase for pilot requirements.

#### Mandatory Pilot Retirements

The number of major airline pilots reaching the mandatory retirement point will have a significant impact on major airlines' demand for new pilots. As the airlines grew in the early 70's, they hired an increasing number of "Vietnam era" pilots. The FAA currently mandates that a pilot may not act as pilot in command or first officer after reaching the age of 60. This forces an increasing number of pilots into mandatory retirement. Table 4 shows the number of major airline pilots retiring through 2010.

Table 4. Major Airline Pilot Retirements (Greer et al., 1992:16)

<b>Year</b>	<b>Mandatory Retirements</b>	<b>Year</b>	<b>Mandatory Retirements</b>
1992	810	2002	1478
1993	917	2003	1237
1994	1117	2004	1004
1995	1125	2005	1072
1996	1254	2006	1147
1997	1301	2007	1432
1998	1524	2008	1482
1999	1615	2009	1522
2000	1635	2010	1420
2001	1464		

At first glance, this table should be an eye-opener to those unaware of its impact on airline demand for Air Force pilots. Traditionally, the major airlines have hired approximately 75% of their new-hires from the military, about two-thirds of these from the Air Force (or about half of their new-hires from the Air Force). After 2001, the airlines will not be able to hire Air Force pilots at these rates because there will not have been enough produced (eight years prior) even if all eligible pilots left the Air Force.

Also, the table shows the number of retirements peaking at 1635 per year in 2000. Then, after dropping off for a few years, it peaks again in 2009. The reader must use caution when using numbers past 2006. In 1996, the major airlines hired pilots as old as 53 (although the average age was much younger--34.1). These pilots will reach mandatory retirement in 2003. As airlines begin to choose between less experienced, civilian-trained pilots and older, experienced pilots, it becomes likely that more 50-year old pilots will be hired. Since this data was taken from a 1992 source, older pilots hired

after 1992 (who face retirement as early as 2006) do not show in these retirement numbers.

### Summary

There is no doubt that airline demand for pilots will continue to increase well into the future. A recessionary period may moderate demand for short periods of time. However, subsequent growth periods will likely accelerate pilot hiring. Another factor influencing the supply of pilots available for hire by the U.S. major airlines is foreign air carrier demand for U.S.-trained pilots. These airlines have traditionally sought experienced flight crews, particularly during times of expansion. The Pilot and Aviation Maintenance Technician Blue Ribbon Panel expects foreign demand for U.S. pilots to increase dramatically well into the future (Dept of Transportation, 1993:26). The impact of these numbers was not discussed in this chapter due to the lack of available data.

The various factors impacting airline demand for pilots makes accurate demand-forecasting difficult. Nonetheless, demand forecasts are necessary (especially for Air Force planners) to determine the impact on pilot retention. Historically (1985 through 1995), the number of pilots employed by the scheduled airline industry increased at 4.3%, exceeding the rate of increase in revenue passenger miles and passenger enplanements (Dept of Commerce, 1997). Based on airline growth estimates highlighted earlier in this chapter, a 3% annual airline pilot growth over the next 15 years is a conservative estimate.

Of course, overall airline pilot requirements will originate from both airline growth as well as retirement replacements. The following figure estimates annual major

airline pilot requirements by combining a 3% growth forecast with replacement of retired pilots (based on the 1997 major airline pilot inventory of 56,526). As the figure clearly indicates, major airline hiring requirements stay around 3000 pilots per year until 2005, then begin to accelerate. Despite the conservative estimates from this figure, Air Force planners expect pilot retention to increase as airline hiring moderates (2000 to 3000 pilots per year) from 2000 through 2004 (Nickles, 1998).

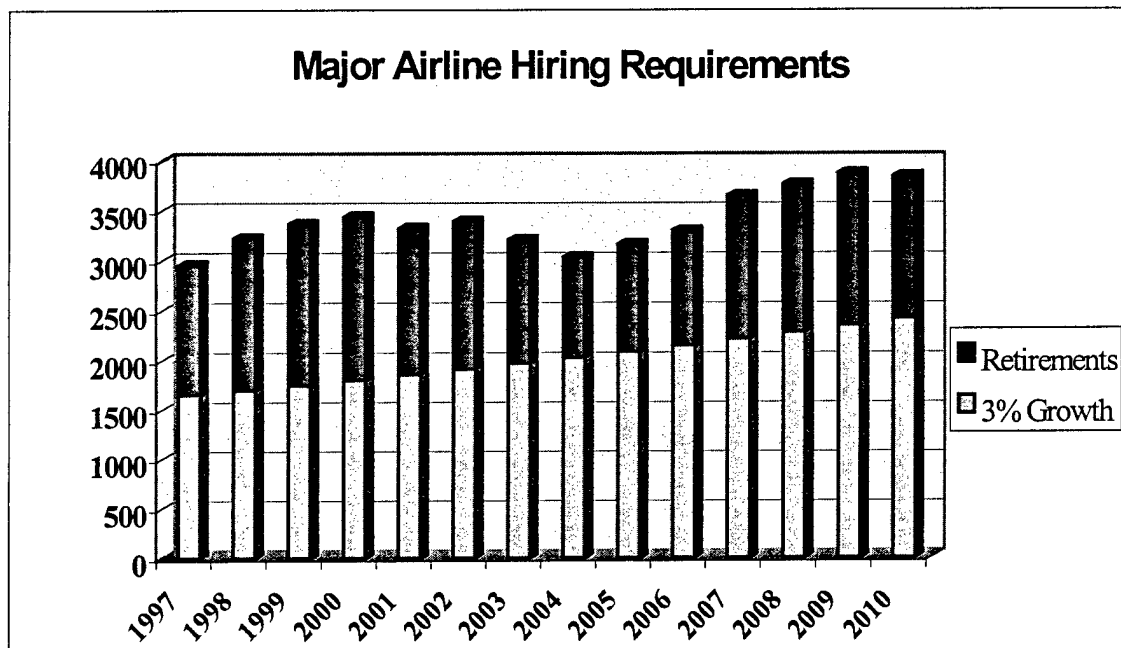


Figure 7. Major Airline Hiring Requirements  
(Garton, 1998; Greer et al., 1992:16)



## V. Major Airline Requirements Effect on Air Force Retention

### Overview

The continued growth of the airline industry, particularly the major airlines, combined with a smaller Air Force are likely to affect Air Force pilot retention more than ever. Historically, pilot retention has varied according to airline hiring needs. On the active duty side, the reduced numbers of pilots produced will confront higher demand from both the Air Force and the airlines. This chapter compares relative pilot inventories (historical and projected) of the major airlines and the Air Force. It also looks at future major airline hiring requirements relative to expected Air Force pilot availability.

Additionally, the force drawdown changed the active duty/Air Reserve Component (ARC) force mixture. The proportion of active duty pilots reduced substantially while Air National Guard and Air Force Reserve forces remained constant. The number of pilots in the new force structure is no exception. The active duty Air Force, the ARC's primary supplier of pilots, does not produce as many pilots as it once did. This chapter takes a brief look at past hiring by the ARC, the number of active duty pilots applying for hire, and the number of pilots the Air Force will be able to supply in the future.

### Impact on Active Duty Air Force

As the airline industry continues to grow and the Air Force pilot inventory shrinks, airline demand for Air Force pilots will increase. A comparison of major airline growth against the relative size of Air Force pilot inventories should prove useful in

understanding this relationship. Additionally, a history of Air Force retention rates is used to anticipate future pilot retention. A retention estimate is used to calculate the number of probable pilots available for airline hire relative to airline hiring forecasts.

It is well known that the airlines have continued to grow over time while the Air Force became smaller. The magnitude of airline growth compared to the magnitude of Air Force pilot reductions, however, may be new to some. During the Vietnam years, the Air Force had over 40,000 pilots (Van Horn, 1998). The major airlines did not employ

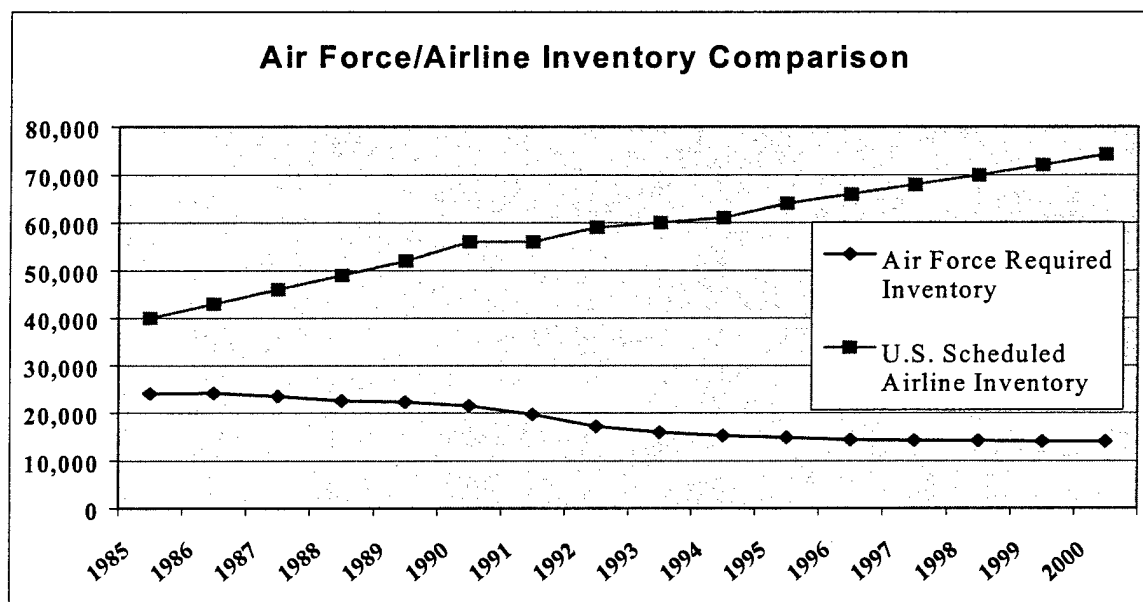


Figure 8. Air Force/Airline Inventory Comparison  
(Dept of Commerce, 1997; Van Horn, 1998; Nickles, 1997)

40,000 pilots until 1985 (Dept of Commerce, 1997). Figure 8 displays the relative size of pilot inventories in the U.S. scheduled airline industry (slightly more than the major airlines) compared to Air Force requirements since 1985. As the figure shows, in 1985, the airlines employed a slightly larger pilot inventory than the Air Force. By 1998, the airlines employed nearly five times as many pilots. Comparisons between today's retention and late 1980s retention need to be tempered by this recognition.

Additionally, when using past retention rates to forecast future retention, the impact of past policies must be taken into account. Table 5 shows the CCR at a low in 1979, at a high in 1983, then annually since 1989. Recall that the CCR lags 21 months behind associated airline hiring activity (Chapman, 1997:68). For example, the 1997 long-term bonus take rate was 34% while the CCR was at 57%. Through March of 1998, the long-term bonus take rate was down to 28%. According to the figures, one would expect the Air Force would like to return to 1994-1996 retention rates. However, those rates were “colored” by some of the personnel policies in force at the time, particularly

Table 5. Annual Air Force Pilot Retention Rates  
(AMC Retention Update, 1998)

<u>FY</u>	<u>6-14 Year CCR (%)</u>
1979	21
1983	73
1989	30
1990	30
1991	30
1992	26
1993	45
1994	70
1995	72
1996	60
1997	57

the “feet on the ramp” policy. Since the airlines were not hiring heavily and pilots faced a decision to take the bonus or be grounded, many more took the bonus than would otherwise have done so. This program, in conjunction with the general Air Force drawdown, makes the retention figures from that period somewhat suspect. Additionally, pilots who felt pressured to take the bonus are more likely to get out after their bonus commitment expires.

If the drawdown had not occurred, retention data and airline hiring data presented earlier support previous conclusions that the Air Force would have faced today's retention problems as early as 1994. Yet, faced with 6-14 year CCR rates below 30%, current long-term bonus take rates at 28%, and forecasts for continued airline demand for Air Force pilots, the Air Force (as of October of 1997) based future inventory forecasts on 40% long-term bonus take rates (Nickles, 1997). The Air Force recently adjusted fiscal year 2003 forecasts based on a revised 32% long-term bonus take rate. An 8% change in the expected bonus take rate within six months provides another indication of arbitrary, short-term planning (Nickles, 1998).

It is difficult to predict future retention rates. However, given the nature of airline growth and past demand characteristics, assumptions should consider that airline demand for Air Force pilots will increase. From 1988 through 1994, the airlines displayed a willingness to hire over half of their new pilots from the Air Force (see Table 2). Air Force pilot availability will not allow a repeat, but it does put the relationship between current pilot availability and airline pilot demand in perspective. Figure 9 may help as well.

Figure 9 displays expected major airline hiring requirements vs. 66% Air Force pilot availability. The hiring requirements include expected 3% airline growth plus replacement of mandatorily retired pilots. Air Force pilot availability was derived from pilot production rates of earlier years. For instance, pilots trained in 1989 incurred eight-year service commitments and became "available" in 1998 (assuming no other service commitments). The availability numbers assume 33% Air Force retention or a 66% airline availability for the pool of pilots trained nine years earlier. The 33% retention rate

is arbitrary, and probably optimistic. As the data clearly show, the airlines can not come close to their previous reliance on Air Force pilots to fill their hiring needs. Figure 9 does not include the relatively small number of pilots hired after Air Force retirement. On the other hand, not all pilots who depart active duty desire airline employment.

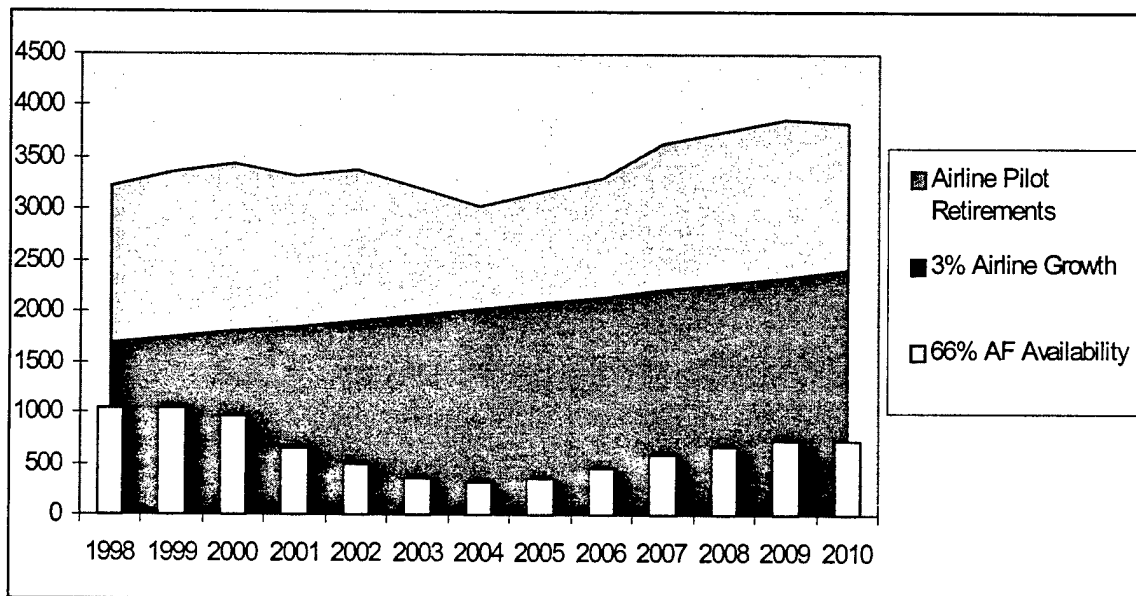


Figure 9. Airline Hiring Requirements vs. AF Pilot Availability  
(Greer et al., 1992:16; Garton, 1998; Van Horn, 1998)

One of the current methods under consideration for alleviating future pilot shortages is to increasing the length of UPT service commitments to 10 or 11 years. Of course, this will not help improve inventory levels until those pilots reach the ten-year point in 2008. It will also leave the airlines with “empty” years of Air Force pilot availability, thereby increasing their future desirability. Additionally, it will leave the Air Reserve Components (ARC) with empty years of pilot availability. The next section analyzes the impact of decreased pilot production, decreased retention, and possible

policy decisions such as increased service commitments on the Air Force Reserve and Air National Guard.

#### Impact on the Air Reserve Component

The Air Force Reserve and the Air National Guard rely on the supply of departing active duty pilots to fill their pilot vacancies. Traditionally, this has not been a problem. The ARC was much smaller than the active duty giving the ARC their choice of willing pilots. Force structure changes resulting from the force drawdown kept the ARC at nearly the same size while reducing active duty forces. This, of course, resulted in a growing share and changing mix of aircraft and missions housed in the ARC. In Air Mobility Command, for instance, 50% of the command's mobility capability lies in the ARC (AF Reserve Component, 1998). The effect of force restructuring, combined with years of decreased pilot production present the ARC with pilot supply problems. Since a much larger portion of Air Force capability lies in the ARC, maintaining the strength of the guard and reserve becomes increasingly important.

Total ARC pilot requirements have stayed about the same throughout the drawdown. The Air Force Reserve actually has a fiscal year 2000 pilot requirement of 3883 pilots, an increase over the 1990 requirement of 3644 pilots (Percich, 1998). The Air National Guard has a slightly reduced pilot requirement of 3894 pilots in 2000 versus 4109 pilots in 1994 (Turner, 1998).

The combined effect of a large ARC force combined with decreased active duty pilot production will limit the ARC's capability to fill future hiring needs. Pilots who retire from active duty are not eligible to join the ARC. Therefore, only pilots leaving

active duty before retirement are eligible. The ARC pilot requirement is approximately the same as it was in the early 90s, while the active duty supply is 30% smaller.

Additionally, the active duty substantially cut pilot production in 1994. When the current cohort of pilots becomes eligible to join the ARC in 2002, the ARC will face a shortage of pilots even as their requirement remains the same. Conceivably, the requirement could even increase as the ARC is assigned more missions (C-17, pilot training instructors, etc.).

The Air Force Reserve is facing additional pressure such as reduced pilot retention and pilot retirements. Over the past two years, they have experienced a 15% annual pilot turnover while 75% of their Air Reserve Technicians are actively looking for other employment (McGregor, 1998). At 15% turnover, the reserve force will require 540 pilots per year to replace outgoing pilots. Additionally, the reserve is anticipating a retirement spike in 2000, when approximately 388 pilots are expected to retire (McGregor, 1998).

Pilot manning in the guard is worse than the active duty. They are currently short approximately 400 pilots (a 10% shortfall) and expect the shortage to get worse every year through 2006 when they expect to be 800 pilots short (Turner, 1998). Figure 10 displays the guard's annual requirement versus the expected inventory.

The active duty produced an average of 590 pilots per year for a five-year period during the 90s, not nearly enough to satisfy ARC hiring requirements. The guard expects to lose approximately 350 pilots per year while the reserve expects to loose at least 500

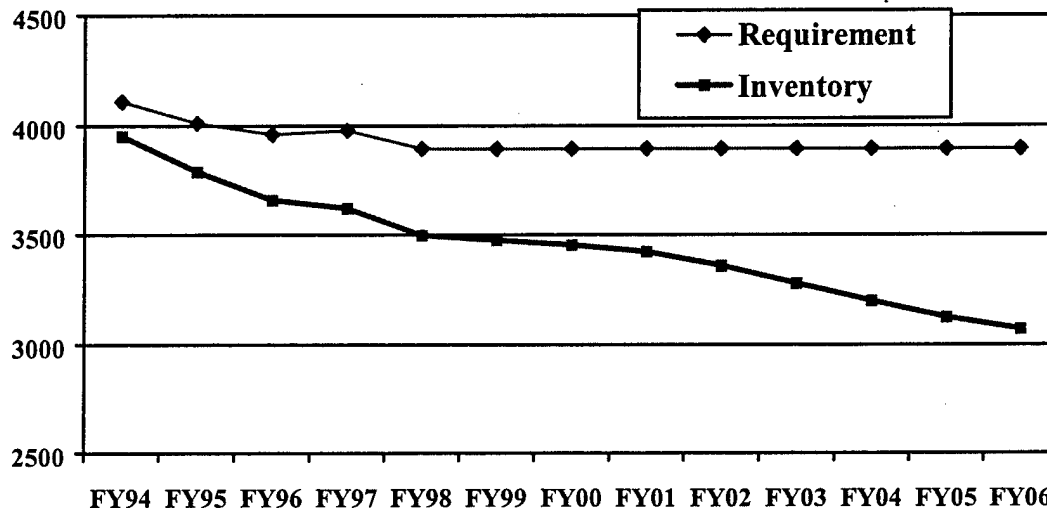


Figure 10. ANG Pilot Redline/Blueline (Turner, 1998)

per year. Historically, the ARC hired approximately 40% of eligible departing active duty pilots (although approximately 60% expressed an interest). More than this will be required in the future (Graf et al., 1994:40). The guard is planning on hiring 33% of future eligible pilots and the reserve is planning to hire an additional 25% (McGregor, 1998; Turner, 1998). Hence, the combined ARC-hires total would be 58% of eligible candidates. In 1997, the guard aggressively hired pilots, but it was only able to hire 28% of those eligible (Turner, 1998). The ARC planning figures may be unrealistic unless more is done to entice eligible pilots to join the ARC.

While the hiring percentages are optimistic, the number of pilots departing active duty are not. Both the guard and reserve expect 50% of any year group to become



eligible following UPT service commitments. As discussed earlier, there will likely be very few years the active duty retains 50% of any year group. Decreased active duty retention will provide a larger pool of eligible pilots for the ARC.

Nonetheless, even a 33% retention (making 66% of a year group eligible) will not fill ARC hiring requirements during the period 2001-2005. Recall the five-year period (1993-1997) when the active duty produced an average of 591 pilots per year. Pilots trained during those years will reach the end of their service commitments between 2001 and 2005. At a retention rate of 33%, an average of 390 pilots per year leave active duty and become eligible for the ARC. In addition to the ARC pilots sent through UPT, 390 pilots per year would not come close to filling ARC requirements. If the ARC hires only 60% of eligible pilots, that number is reduced to 234 per year. Essentially, the ARC is experiencing more of an active duty production problem than a retention problem.

### Summary

Historically, the major airlines relied on the Air Force to supply nearly 50% of their pilot hiring needs. This can no longer continue due to the relative size of the Air Force and the airlines. In 1980, the airlines employed slightly more pilots than the Air Force. By the late 80s, the airlines employed twice as many pilots, and, in the near future, will employ five times as many pilots. Airline demand for Air Force pilots will increase as long as this ratio continues to increase. This demand will continue to reduce Air Force pilot retention. The retention problems the Air Force is dealing with today would have occurred by 1994 had the force drawdown not taken effect.

The force drawdown reduced the size of active duty forces but maintained the size of ARC forces. This new ratio of ARC to active duty pilot requirements presents new problems. Not enough active duty pilots exist to fill ARC hiring needs. For a five-year period from 1993 through 1997, the Air Force produced an average of 590 pilots per year. This is insufficient to meet future ARC hiring needs. At the same time the ARC needs the limited supply of pilots to separate from active duty and join the reserve or guard, the active duty needs those same pilots to remain on active duty.

Due to the increased importance of ARC forces in today's military capability, they are experiencing the same increased operations tempo as the active duty. Air Force Reserve pilots average 121 days worked per year compared to the reserve requirement for 33 days (McGregor, 1998). A continued high operations tempo will likely increase pilot turnover in the ARC, presenting them with a retention problem in addition to a production problem. The active duty needs to be aware of ARC hiring requirements as pilot retention problems are worked out. For instance, the proposed 10-year UPT service commitment will leave the guard and reserve with no eligible pilots for two years. This will undoubtedly affect the readiness of those forces. Additionally, since the supply of departing active duty pilots will be insufficient to fill guard and reserve demand, more UPT slots need to be allocated to train guard and reserve pilots from scratch.

## VI. Recommendations and Conclusions

### Research Paper Summary

Understanding the effect of airline hiring on pilot retention is necessary to determine the proper, most cost-effective course of action to fix the pilot retention problem. To accomplish this objective, this research analyzed the history of major airline hiring trends and past reliance on Air Force pilots. The airlines' future reliance on military pilots could be altered by the availability of civilian pilots and airline growth. Chapter III analyzed the nature of the military versus civilian pilot source of supply to the major airlines, while chapter IV estimated future airline pilot demand based on growth requirements and replacement of retiring pilots. Finally, chapter V used forecast pilot requirements from chapter IV and discussed related retention issues on active duty and ARC pilot forces. This is a summary of conclusions for each chapter.

The pilot retention problem has plagued Air Force planners for some time. The first chapter covers the background of this issue. The Air Force reduced its pilot requirement from over 55,000 in the 1950s to approximately 14,000 today. The drawdown has been steady at times and rather accelerated at other times. Attempting to react to changes in pilot demand is difficult due to long lead times required to select and train pilots. Often, as soon as a drawdown has taken effect, pilot retention drops as airline hiring accelerates, producing a shortage of Air Force pilots. Some research has been devoted to this and related issues. One study concludes a strong relationship exists between perceived employment opportunity and high turnover while another concludes a relationship exists between economic variables and pilot retention. Yet, the Air Force

appears to arbitrarily select inventory forecast assumptions such as bonus take rates. An additional study accomplished in the midst of the 1990's drawdown forecasted an Air Force pilot shortage after 1997.

Understanding past hiring characteristics is essential to understanding the future impact of airline hiring on pilot retention. The major airlines hire most of the departing Air Force pilots. The major airlines pay more to their pilots and prefer the military pilot to the civilian-trained pilot based on relative experience levels and standardized training practices. The major airlines also employ 75% of all airline pilots. They tend to hire a greater percentage of military pilots during periods of slow hiring and lower percentages of military pilots during peak hiring (due to the availability of military pilots). From 1988 through 1994, half of the pilots hired by the major airlines came from the Air Force. Smaller airlines supply the remainder of major airline hiring needs. Although these airlines employ fewer pilots than the majors, they tend to have rapid turnover, particularly during peak hiring, forcing them (as a group) to hire more pilots than the majors. The smaller airlines hire less experienced pilots and have higher turnover. This further reduces the average experience level of civilian-trained pilots compared to the military pilot.

The major airlines have two sources of available pilots to fill their hiring requirements—the military pilot and the civil aviation pilot. If the availability and quality of civilian-trained pilots were to increase, airline demand for the military pilot could diminish. However, the airlines currently have a high demand for military pilots. The Air Force attempted numerous programs to manage the pilot force during the drawdown and, later, as it faced a pilot shortage. Attempts to increase retention have not

worked. Meanwhile, the quantity of civilian-trained pilots is not increasing. For over 15 years, the number of general aviation hours flown and the number of licensed private pilots decreased. They are expected to increase modestly in the future. Increased UPT service commitments began to limit the number of pilots eligible for airline hire in 1996. Decreased UPT production will continue to limit future military pilot availability. Major airline demand for a more limited supply of Air Force pilots will increase in the future.

The growth of the major airlines is also forecasted to continue its upward trend. In the past, the number of pilots employed by the major airlines and the number of revenue passenger miles flown increased every year (including the recessionary years) except 1991, the year of the gulf conflict. Many factors including economic fluctuations, the move from three to two-pilot aircraft, and new airline alliances could affect airline pilot requirements. Nonetheless, the most conservative estimates for airline pilot requirements forecast greater than 3% annual growth. Cargo carriers will experience higher rates of growth than passenger carriers and could easily boost future requirements even more. Additionally, the airlines are entering years of increased pilot retirements. Airline growth and retirement factors contribute to increasing airline pilot demand well into the future.

Airline demand for military pilots will continue to affect Air Force retention (active duty and ARC) well into the future. In the late 80s, the airlines employed approximately twice as many pilots as the Air Force. By 2000, they will employ approximately five times as many pilots. Due to increased experience levels of military pilots compared to their civilian counterpart, airline demand for the diminishing supply of military pilots will increase in the future. Additionally, Air Force restructuring assigned

an increased proportion of military capability to ARC forces. Heavy reliance on ARC forces (increased operations tempo) combined with airline demand is decreasing retention of ARC pilots. Active duty pilot production during the mid 90s will be insufficient to satisfy future ARC hiring requirements. The Air National Guard is experiencing a 10% pilot shortage in 1998, and is expecting the shortage to get worse every year through 2006. The ARC will require a combination of increased retention, increased hiring of eligible, departing active duty pilots, and increased UPT production to maintain proper levels of pilot manning.

### Recommendations

There is no single, best solution to fix the Air Force's pilot retention problem. The retention problem is not limited to pilots, either. A recent *Air Force Times* article summarized the difficulties surrounding declining enlisted-retention rates as well (Jordan, 1998). Pilot retention garners more headlines and is a bigger problem because training pilots is more expensive and involves long selection and training lead-times. The basis of the problem stems from the tried and true economic principle of supply and demand. The Air Force is not going to fix pilot retention by paying pilots more money—the military cannot afford it. For example, the typical major airline pilot, throughout a 30-year career, averages \$196,673 per year (Darby and Gradwohl, 1997:126). The typical United Airlines pilot (the top-paying airline) leads the pack with an average salary of \$284,260 per year (Darby and Gradwohl, 1997:125). While a single, fix-it solution does not exist, there are some things defense personnel planners and congressional money providers should consider.

Past pilot inventory planning lacked a long-term focus. Because pilots have long selection and training lead times combined with eight-year service commitments, planners need to maintain a long-term focus. This was lacking during the drawdown where numerous policies including “feet on the ramp”, banked pilot program, and early release programs disillusioned pilots, including many of those who stayed. Additionally, while pilot training production was cut to 523 in 1996 and 673 in 1997, the Air Force experienced a mere 400-pilot overage in 1996 and became 40 pilots short by 1997 (Van Horn, 1998). Prudence would have dictated keeping an overage of pilots in anticipation of the forthcoming pilot shortage. A large number of pilots currently on active duty will leave the Air Force at their first opportunity due to past Air Force policies that demonstrated a lack of commitment.

There is still evidence of the short-term focus today. In October, personnel planners based future inventory levels on assumptions of 35% long-term bonus take rates in 2000 increasing to 40% by 2003 (Nickles, 1997). The most current Redline/Blueline Report decreased fiscal year 2000 long-term bonus take rates to 29% increasing to 32% by 2003 (Nickles, 1998). The reductions occurred with no anticipated changes in airline hiring. The Redline/Blueline Report itself is focused in the short term; its projections extend to fiscal year 2004, less than six years away.

Increasing UPT production could increase future pilot inventory levels to the desired level, but it would not fix the retention problem. Planners could decide to accept and plan for low pilot retention by sending more pilots than otherwise needed through pilot training. If 75% leave the Air Force at the end of their service commitments, the remaining 25% would be sufficient to fill Air Force requirements. This would also

increase the supply of pilots to the major airlines (who will be in dire need of experienced pilots) as well as the ARC community. However, pilot training is very expensive and the Air Force should not be in the business of supplying pilots to the airlines—economic principals already do that. While increasing UPT production could fix the pilot shortage problem, it is not likely to be a cost-effective method.

Increasing UPT service commitments to 10 years will also increase future pilot inventory levels (not retention). While this option is likely the easiest and cheapest to implement, it has its problems. A pilot training commitment of 10 years puts an officer at the 11-year point before becoming eligible to decide whether or not to make the Air Force a career. However, the Air Force may have already decided for him/her since the 11-year point is beyond the time of selection/nonselection to the rank of major. If the Air Force were to ask that much commitment of a new officer, the Air Force should return that commitment. This increases the likelihood of moving to a two-track system where some pilots are moved to a pilot-only career track, a proposal the Air Force has avoided. Increasing service commitments also leaves the ARC community two years without eligible pilots to fill their hiring needs. While it is possible to fill future pilot requirements by increasing UPT service commitments, the Air Force would not begin to feel the impact of this decision for eight years (beyond the effectiveness of UPT service commitments). This is well beyond the Air Force's planning horizon and still leaves us with the retention problem until then.

Increasing pay is a common solution advocated in the Air Force. Retention studies cited in chapter one of this study support the theory that high turnover is related to perceived employment opportunity and pilot retention is linked to economic variables.



While this may be true, the Air Force can not compete with airlines that pay pilots average earnings in excess of \$200,000 per year (Darby and Gradwohl, 1997:125). Additionally, the pilot bonus has proven, again and again, to be less effective than many hoped. While the bonus may not be an effective fix to the retention problem, it may be cost effective. Compared to the exorbitant cost of training a new pilot, offering a bonus (a common military practice in other high-cost career fields such as medical and legal) may entice enough pilots to stay to make it cost effective. Although the pilot bonus has been offered for many years, it is temporary in nature (requires annual congressional approval) and applies for only five years. Therefore, it may not be the best bet.

A general increase in pay or an increase in pilot flight pay, while certainly more costly, could prove a more effective retention tool. Recall that pilot retention is a by-product of supply and demand. Increasing the pilot bonus, increasing base pay, or increasing flight pay will not fix the retention problem. Pay increases may, however, be cost effective by enticing a few more high-cost pilots to serve longer. Increasing base pay would help the pilot retention problem as well as retention problems in other career fields. Reasons given for decreased enlisted retention rates included higher-paying employment opportunities and decreased Air Force retirement packages (Jordan, 1998).

Replacing the current pilot bonus system with a substantial increase in flight pay could also entice more pilots to stay in the Air Force. Once again, this will undoubtedly cost more than the current pilot bonus, but could be more effective. The current bonus extends a pilot for five years. If the bonus program were scrapped in favor of pilot flight pay increases at the end of the UPT service commitment, more pilots may elect to stay two, three, or four years longer without being locked into a five-year commitment.

Additionally, more pilots may elect to stay past the 14-year point. Current programs combined with airline hiring demands and airline salaries entice pilots to leave the Air Force at the end of their bonus commitment. A substantial flight pay increase will be required to make this option effective.

The bulk of this research project concentrated on the numerical relationship between airline hiring and pilot retention. However, the impact of qualitative factors, particularly quality of life, can not be underestimated. While pilot retention is a function of supply and demand, it is possible to marginally increase retention through quality of life improvements. Most pilots who leave the Air Force for the airlines do so, not for the money, but because the opportunity exists for a change of life style. Improvements in such things as operations tempos, family housing, ease and frequency of Permanent Change of Station moves, child care, and retirement benefits would make it easier for Air Force members to find the passion necessary for a career of service in the military. In short, qualitative improvements in the life style of Air Force members increase the Air Force's demand for its people, thereby increasing retention.

Regardless of the retention program the Air Force selects, understanding the nature of pilot supply and demand characteristics remains essential. Major airline pilot inventories are nearly five times those of the Air Force. The airlines, even with moderate hiring requirements, will continue to display demand for the smaller, but highly coveted, supply of Air Force pilots. The Air Force, however, can not afford to give up on current efforts to improve operations tempos, housing, pay, retirement benefits, or the multitude of other quality of life initiatives. While retention initiatives may only improve retention

at the margins, or in small percentages, the margins must be worked. In the end, much of the Air Force retention problem belongs to Congress, the holders of the purse strings.

### Suggestions for Future Research

This research (particularly chapter V) touched only briefly on the impact of pilot retention on the ARC community. Under the restructured Air Force, the Air Force Reserve and the Air National Guard have increased in relative size and importance. Today, the Air Force counts on reserve and guard pilots to fill an increasing number of missions. An entire research project could be devoted to retention and pilot production issues affecting this community.

The qualitative impact of Air Force policies on retention can not be underestimated. This paper concentrated on the quantitative impact of policies and the physical limitations of supply and demand. As suggested earlier, qualitative improvements can marginally increase retention. The marginal increase in retention resulting from a particular policy is unknown. Admittedly, it is difficult to measure improvements attributable to a specific quality of life improvement. Nonetheless, research in this area is lacking but could prove useful to better understanding retention.

As mentioned earlier, pilot retention is a small part of the Air Force retention problem. Research into the impact of high turnover of personnel in other career fields, particularly enlisted, could prove worthwhile. Few career fields involve the high training costs associated with pilots, so solutions may not be the same. Perhaps, it may be more cost effective to boost training and accept increased attrition during periods of low retention. It may be possible to link retention and retention assumptions (including pilot

retention assumptions) to economic variables. A study of factors affecting retention in other career fields may be warranted.

Finally, it has often been suggested that short-term personnel planning may be the result of commanders filling short-term positions. In other words, commanders who are only assigned to a job for a short period of time may be more inclined to accept short-term results. Further analysis of this relationship may prove beneficial. Perhaps short-term solutions are instead the result of short-term congressional mandates and congressional funding instead of a short-term focus. In either case, the results would prove interesting.

## **Appendix A**

### **AF Pilot Production, Inventory, and Requirement (1951-2003)**

<b><u>FY</u></b>	<b><u>Pilot Production</u></b>	<b><u>Pilot Inventory</u></b>	<b><u>Pilot Requirement</u></b>
1951	2006	41,259	55,100
1952	3125	44,129	55,800
1953	5451	45,789	53,200
1954	6401	46,728	57,000
1955	5787	50,067	57,100
1956	5701	52,427	57,300
1957	5333	54,489	57,300
1958	3618	51,711	50,000
1959	2325	50,803	48,500
1960	2116	50,451	48,000
1961	1795	48,798	47,800
1962	1299	49,427	45,700
1963	1433	46,837	43,900
1964	1675	45,257	41,800
1965	1992	43,050	37,400
1966	1969	40,449	38,200
1967	2768	38,447	46,200
1968	3092	37,632	43,400
1969	3216	36,832	37,900
1970	3521	34,808	36,600
1971	3895	34,782	35,100
1972	4032	35,194	32,400
1973	3033	33,171	32,000
1974	2167	31,158	28,500
1975	2003	29,643	26,400
1976	1659	28,361	23,900
1976T	388	28,017	23,500
1977	1316	26,372	23,300
1978	1084	24,913	21,900
1979	1047	22,471	23,800
1980	1543	21,896	23,000

<u>FY</u>	<u>Pilot Production</u>	<u>Pilot Inventory</u>	<u>Pilot Requirement</u>
1981	1693	22,297	23,400
1982	1875	22,814	23,700
1983	1783	23,458	23,800
1984	1937	23,901	23,600
1985	1872	24,198	24,000
1986	1700	24,210	24,200
1987	1453	23,663	23,500
1988	1510	22,819	22,600
1989	1581	21,750	22,300
1990	1581	20,917	21,500
1991	1468 (384 Banked)	19,617	19,672
1992	974 (364 Banked)	17,890	17,157
1993	749 (329 Banked)	16,738	15,939
1994	533	15,963	15,207
1995	480	15,361	14,863
1996	523	14,774	14,365
1997	673	14,165	14,207
1998	900		
1999	1025		
2000	1095		
2001	1100		
2002	1100		
2003	1100		

## Appendix B

### Fleet Makeup of Major Airlines

Aircraft	ABX	ASA	AA	AMW	CON	DEL	FDX	NWA	SWA	TWA	UAL	UPS	USA	ALL
B-747-100											10	12		22
B-747-All					4			41		5	40	2		92
B-777											29			29
B-767	4		71			65				14	42	15	12	223
B-757			90	14	22	190		48		15	93	60	34	566
B-737		36		61	134	71			252		211		203	968
B-727			81		43	124	163	43		31	75	59	59	678
A-300			35				22							57
A-310							35							35
A-320				26				50			43			119
DC-10			20		32		57	33			31			173
DC-9	66				30			176		58			57	387
DC-8	35											49		84
MD-11			17			14	23							54
MD-80/90		42	260		69	136		8		65			31	611
L1011						47								47
F-100			75										40	115
<b>Total</b>	<b>105</b>	<b>78</b>	<b>649</b>	<b>101</b>	<b>334</b>	<b>647</b>	<b>300</b>	<b>399</b>	<b>252</b>	<b>188</b>	<b>574</b>	<b>197</b>	<b>436</b>	<b>4260</b>

Legend: ABX=Airborne Express, ASA=Alaska Airlines, AAL=American, AMW=America West,  
 CON=Continental, DEL=Delta, FDX=Federal Express, NWA=Northwest, SWA=Southwest,  
 TWA=Transworld Airlines, UAL=United, UPS=United Parcel Service, USA=US Airways

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### Vita

Captain John H. Kafer was born on 19 October 1964, in Manchester, Iowa. He graduated from Central Community of Elkader High School in 1983 and entered undergraduate studies at the United States Air Force Academy. He graduated with a Bachelors of Science degree in Political Science and International Affairs in 1987.

Following his commission in 1987, he completed Undergraduate Pilot Training at Vance AFB, Oklahoma as a distinguished graduate. His first assignment was flying KC-10 air refueling aircraft at Barksdale AFB, Louisiana. While at Barksdale AFB, he flew many missions in support of Operation Just Cause, Desert Shield, Desert Storm and Restore Hope, gaining invaluable experience in crisis response. He also served as chief of scheduling and evaluator pilot in the 32<sup>nd</sup> AREFS.

After being selected on the crossflow board in 1994, Captain Kafer went to Altus AFB, Oklahoma for C-5 training. He then moved to Travis AFB, California, where he served as chief of mission control for the 22<sup>nd</sup> AS, wing training and tactics officer for the 60<sup>th</sup> OSS, and flight commander for the 22<sup>nd</sup> AS.

In June 1997, Captain Kafer was assigned to the Air Mobility Warfare Center as a Student in the Advanced Study of Air Mobility (ASAM) program. After graduation from the ASAM program, he will attend Army Command and General Staff College at Fort Leavenworth, Kansas.

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The purpose of this questionnaire is to determine the potential for current and future applications of AFIT research. **Please return completed questionnaire to:** AFIT/LAC BLDG 641, 2950 P STREET, WRIGHT-PATTERSON AFB OH 45433-7765 or e-mail to [dvaughan@afit.af.mil](mailto:dvaughan@afit.af.mil) or [nwiviott@afit.af.mil](mailto:nwiviott@afit.af.mil). Your response is **important**. Thank you.

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4. Whether or not you were able to establish an equivalent value for this research (in Question 3), what is your estimate of its significance?

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